SALMON AND STEELHEAD HABITAT LIMITING FACTORS

WATER RESOURCE INVENTORY AREA 31

WASHINGTON STATE

CONSERVATION COMMISSION

Kevin Lautz

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ACKNOWLEDGMENTS

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Several maps have been included with this report for your reference. The maps are appended to the report, either as a separate electronic file (for the electronic copy of this report) or separate printed section (for hard copy). The maps are included as a separate electronic file to enable the reader to utilize computer multi-tasking capabilities to simultaneously bring up the map and associated text. Below is a list of maps that are included in the WRIA 31 map appendix/file:

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EXECUTIVE SUMMARY

This limiting habitat factors analysis is conducted pursuant to Chapter 75.46 RCW (Salmon Recovery); its purpose is "to identify the limiting factors for salmonids", where “limiting factors” are defined as "conditions that limit the ability of habitat to fully sustain populations of salmon." The findings of this analysis are to be used by a locally-based habitat project selection committee to prioritize appropriate projects for funding under the state salmon recovery program, as well as assist potential project sponsors in identifying projects.

This initial version of the analysis is limited in its consideration to anadromous fish in **W**ater **R**esource **I**nventory **A**rea (WRIA) 31. As part of the adaptive management process defined in 75.46 RCW, this document will be revised as necessary when more information becomes available.

WATERSHED CONDITION

WRIA 31 (Rock-Glade) encompasses an area of 1650 square miles and consists of numerous small watersheds draining into the Columbia River between John Day Lock and Dam and the mouth of the Yakima River. The geology of the WRIA is dominated by extensive basalt flows having a total thickness of up to 5000 feet. The erosion-resistant nature of these flows has resulted in the creation of deep (500 to 800 feet), steep-walled canyons and has severely constrained floodplain development along substantial portions of the streams within this WRIA.

The streams in this WRIA appear to have similar geomorphic characteristics. Head-water tributaries flow out of the mountains and across the relatively flat basalt plateau at gradients of generally less than one percent; this area is above known anadromous use. Coming off the plateau, streams enter steep-walled canyons; gradients increase to 2 – 4% or more; fish habitat quality is generally fair to poor, with little suitable spawning and rearing habitat. Below the canyon reaches, streams enter alluvial valleys; gradients range between 1% and 2% near the upper end, diminishing to less than 1% as streams approach the Columbia. Fish habitat in these sections is highly variable, ranging from poor to excellent.

Extensive flatlands which existed along the Columbia prior to inundation have formed shallow wetlands and embayments along the shore of Lake Umatilla. These serve as holding or resting areas for migrating adults and juveniles.

Climate over the entire WRIA is typical of that found on the east side of the Cascades; average daily temperatures range from 70°F in the summer (with maximums commonly above 90 °F) and 37°F in the winter. Annual precipitation ranges from 20 to 25 inches in the headwaters of Rock Creek to less than 10 inches over most of the eastern half of the WRIA.

The WRIA is divided between Benton (50%), Klickitat (44%) and Yakima (6%) counties. Over 90% of land base is privately owned. Almost 50% of the land is in agricultural use (primarily wheat and other dryland crops), while 37% is in non-forested range. Less than 10% of the WRIA is forested, primarily in the headwaters of Rock Creek and Pine Creek; much of the forested land also has active grazing allotments. Urban development occupies less than one percent of the WRIA and is limited to the city of Kennewick (pop. 49,000) and a number of small, unincorporated towns.

Distribution and Condition of Stocks

Three species of anadromous salmon utilize the streams in WRIA 31:

Fall chinook found in this WRIA are stray upriver brights belonging to either the wild Hanford Reach stock, or the Bonneville Pool Hatchery stock. Known utilization is limited to the lower portions of Rock Creek and Chapman Creek, and along the shore of Lake Umatilla.

Coho found in this WRIA are believed to be stray hatchery fish; there may also be a minor amount of natural production. Some utilization by juveniles has been noted in the lower portion of Chapman Creek and along the shore of Lake Umatilla; potential coho habitat has been identified in the lower portion of Glade Creek.

Rock Creek **summer steelhead** are the only fish indigenous to the WRIA; this stock belongs to the Mid-Columbia Evolutionarily Significant Unit (ESU) for steelhead, which has been listed as "threatened" under the Endangered Species Act. Known utilization includes the lower and middle portions of Rock Creek, lower Quartz Creek, Squaw Creek, lower Chapman Creek, lower Wood Gulch and Bighorn Canyon. Potential spawning and rearing habitat has been identified in Pine Creek and Alder Creek.

Limiting Habitat Factors

Access

- *Barrier culverts at SR 14 on Pine Creek preclude access to potential steelhead habitat.*

- *Low or non-existent flows in all streams during the late summer, fall, and early winter will limit or preclude utilization by fall spawning adults (chinook, coho), and limit mobility of juveniles of all species.*

- *High stream temperatures in the lower portions of all streams during the summer and early fall will limit mobility of juveniles of all salmonid species.*

Floodplains/Wetlands/Riparian Areas

- *Grazing and trampling by cattle in and near stream banks has caused accelerated channel incision (entrenchment, downcutting) and resulted in a reduction in the quality and amount of available existing or potential fish habitat; continued grazing activity in these areas may delay recovery where functional floodplains and riparian areas are becoming reestablished.*

- *Channel widening and obliteration of riparian zones caused by a 75 to 100 year flood event in 1996 has resulted in locally poor habitat quality and riparian condition. While there may be long term benefits (LWD recruitment, creation of complex habitat) as a result of this event, there may be opportunity to accelerate habitat recovery and improve stability against smaller, more frequent floods through channel and riparian restoration activities.*

- *Cattle watering at, or in the vicinity of, spring areas may have adverse impacts on water quality. Spring outflow into fish-bearing waters may provide important cool water refuges for juvenile salmonids during the summer and early fall.*

- *Functional quality of riparian areas has been adversely impacted by grazing and forest practices in many locations throughout the watershed. Types of impacts include removal of or damage to riparian vegetation and compaction and erosion of stream banks and adjacent floodplain areas.*

Water Quantity and Quality

- *Low or non-existent flows in all streams during the late summer, fall, and early winter will limit or preclude utilization by fall spawning adults (chinook, coho), limit mobility of juveniles of all species, and may result in mortality due to stranding.*

- *High stream temperatures in the lower portions of all streams during the summer and early fall will limit mobility of juveniles of all salmonid species, and may result in mortality due to thermal stress.*

Information Gaps

The limiting factors described above were identified based upon a very limited amount of imformation that was available for this WRIA. More detailed information should be collected to more precisely define these factors, and to identify specific areas where restoration activities will best redress them. The information to be collected includes the following:

- *Further investigstion of fish utilization and habitat availability and quality, to be conducted on all accessible or potentially accessible streams.*

- *Further investigation of potential barriers should be conducted on all fish bearing streams, using an approved assessment and inventory protocol.*

- *More detailed evaluations of the condition of channels, floodplains, wetlands, and riparian areas.*

- *Identification of sediment sources, sinks, and sediment related impacts to habitat.*

- *A stream temperature study to provide a better understanding of the causative factors of high stream temperatures.*

A watershed assessment, funded by the Columbia River Basin Fish and Wildlife Authority and administered by the Yakama Nation, will be initiated in the next year. It is anticipated that most, if not all, of the information needs described above will be accounted for as part of this assessment.

INTRODUCTION

In 1998, the Washington state legislature passed, and the governor signed, Engrossed Substitute House Bill 2496. The resulting law, codified in Revised Code of Washington Chapter 75.46 (see Appendix B), was enacted to "develop a structure that allows for the coordinated delivery of federal, state, and local assistance to communities for habitat projects that will assist in the recovery and enhancement of salmon stocks." The law encourages development of a strong, locally-based effort to restore salmon habitat, and defines a process (the *"critical pathways methodology")* that:

(a) identifies the key factors limiting the productivity of salmon habitat,

(b) gives projects that effectively redress these factors highest priority for state salmon recovery funds, and

(c) requires development of an adaptive management strategy to integrate monitoring and evaluation of implemented projects with habitat restoration planning.

To accomplish items (a) and (c) above, the law requires the Washington Conservation Commission (represented by the Regional Technical Coordinator) to convene a *Technical Advisory Group (TAG)*, consisting of "private, federal, state, tribal, and local government personnel with appropriate expertise", whose primary responsibility is to conduct a *limiting factors analysis* of salmonid habitat. The purpose of this analysis is to identify conditions within the watershed that limit the ability of habitat to fully sustain populations of salmonids, and is intended to provide a scientifically credible and clearly documented basis for identifying and prioritizing appropriate habitat restoration projects. In compiling this analysis, the technical advisory group should strive to meet the following four objectives:

- use existing reports and data to the greatest extent possible;

- provide information that is accessible and understandable by non-fish professionals and an interested public;

- identify limiting factors at all appropriate scales;

- identify knowledge and information gaps.

Other activities to be undertaken by the TAG include:

- working with the project evaluation committee to develop project prioritization criteria and an adaptive management strategy for local/regional habitat restoration programs (including standards and guidance for monitoring and evaluation of individual projects);

- providing technical support and guidance for priority projects.

In February of 1999, the Technical Advisory Group (TAG) for Water Resource Inventory Area (WRIA) 30 convened and initiated the development of a Limiting Habitat Factors Analysis for the Klickitat Watershed. Once the initial version of the Klickitat analysis was completed (July, 1999), the analysis was continued for the anadramous fish-bearing streams identified in WRIA 31 (Rock-Glade). This report documents the findings of that analysis.

The WRIA 30/31 TAG includes the following participants:

- Mike Blakely, District Conservationist, Natural Resources Conservation Service

- Jon Cole, Forester, SDS Timber Company

- David Clayton, District Manager, Eastern and Central Klickitat Conservation Districts

- Carl Dugger, Area Habitat Biologist, Washington Department of Fish and Wildlife

- Gayla Gunther, Landowner, Klickitat County

- Kevin Lautz, Regional Technical Coordinator, Washington Conservation Commission

- Chris Nielsen and Adam Jagelski, Northwest Service Academy (Americorp)

- Bill Sharp, Habitat Biologist, Yakama Nation

- Scott Springer, Wild and Scenic River Coordinator, U.S. Forest Service

- Steve Stampfli, District Chief, Underwood Conservation District

- Tom Tasto, Soil Conservation Technician, Natural Resources Conservation Service

- Wayne Vinyard, Forester, Champion International Corporation

- Bill Weiler, Regional Volunteer Coordinator, Washington Department of Fish and Wildlife

- Lori Zoller, Watershed Coordinator, Klickitat County

This initial version of the analysis is limited in its consideration to anadromous fish in **W**ater **R**esource **I**nventory **A**rea (WRIA) 31. As part of the adaptive management process defined in 75.46 RCW, this document will be revised as necessary as more information becomes available.

WATERSHED CONDITION

Landscape

The Rock-Glade **W**ater **R**esources **I**nventory **A**rea (WRIA 31) encompasses numerous small watersheds draining into the Columbia River between John Day Lock and Dam and the mouth of the Yakima River (Figure 1). Only three of these watersheds are known to have any anadromous fish use (Rock Creek, Chapman Creek, Wood Gulch); three other watersheds (Pine Creek, Alder Creek, Glade Creek) do not have confirmed anadromous fish use, but have been identified as having potential use because of available habitat.

All of the major drainages in this WRIA originate in the Simcoe Mountains or Horse Heaven Hills (which form the northern boundary of the WRIA), and flow in a southerly to southeasterly direction to Lake Umatilla, the portion of the Columbia River impounded by the John Day Lock and Dam. Elevations range from 200 feet at the confluence of Rock Creek and the Columbia River to over 4000 feet in the Horse Heaven Hills.

The geology of the WRIA is dominated by extensive basalt flows having a total thickness of up to 5000 feet (Cline 1976). The erosion-resistant nature of these flows has resulted in the creation of deep (500 to 800 feet), steep-walled canyons and has severely constrained floodplain development along substantial portions of these streams.

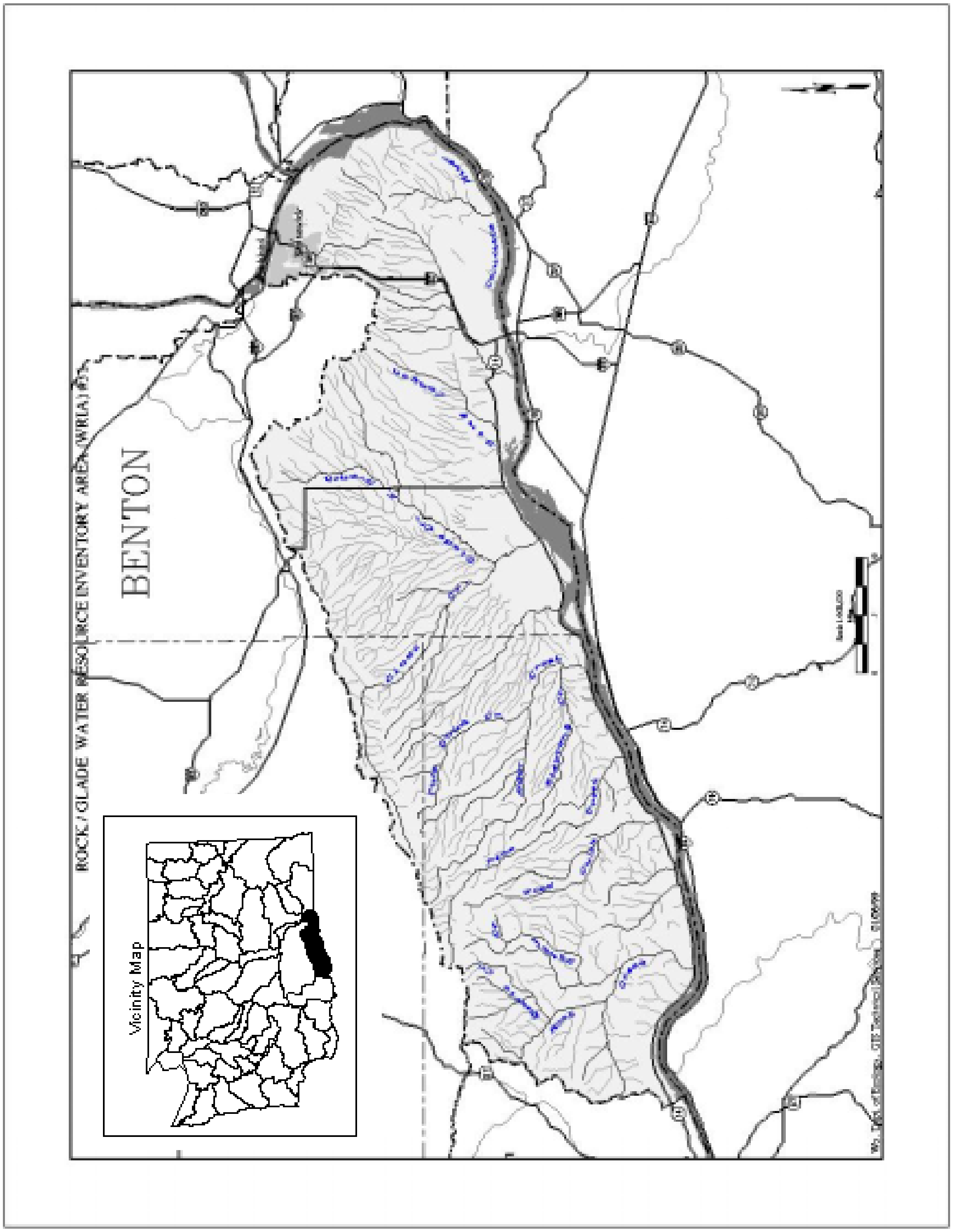
Description of Watershed and Fish Habitat

The watersheds in this WRIA appear to have similar geomorphic characteristics; most of the descriptive information which follows was generalized from information collected on and observations of the Rock Creek watershed.

Headwater tributaries flow out of the mountains and across the relatively flat basalt plateau. Channels are moderately confined to unconfined (although there may be locally confined reaches caused by channel incision) with gradients generally less than 1% on the plateau. Land cover is primarily coniferous forest; land use is managed forest, grazing, and some rural residential. This area is above known anadromous fish use; available fish habitat is used by rainbow trout and non-salmonids such as dace. Fish habitat quality is generally fair to good; however, there are many areas where habitat has been degraded by grazing , road construction, and riparian harvest.

Coming off the plateau, streams enter steep-walled canyons. Channels are highly confined, gradients increase to 2 – 4%, and substrate is characterized by a mix of cobbles and boulders. Land cover is conifer forest or mixed conifer-deciduous forest in the vicinity of streams, transitioning to shrub-steppe in the uplands; land use is primarily grazing, which tends to be limited by steep slopes. Fish habitat quality is generally fair to

Figure 1. Rock-Glade Water Resources Inventory Area (WRIA 31).



poor, due mostly or entirely to the higher stream power in these reaches. Little suitable spawning gravel occurs, and rearing areas (pools) are minimal in extent and quality and
are limited to protected areas behind boulders and along stream margins. Few macroinvertebrates and juvenile fish were observed in surveys conducted by the Bureau of Land Management (1985, 1986), suggesting that these reaches have relatively low productivity.

Below the canyon reaches, streams enter alluvial valleys. Channels are moderately confined to unconfined (although there may be locally confined reaches caused by channel incision), with gradients generally between 1% and 2% near the upper end, diminishing to less than 1% as streams approach the Columbia; substrate is variable, with particle sizes ranging from cobble to silt. Land cover is primarily shrub-steppe in the uplands, with riparian areas transitioning downstream from mixed conifer-deciduous forest to deciduous forest to shrub-grassland; land use is primarily grazing, which tends to be concentrated in the riparian zone. Fish habitat is highly variable, ranging from poor where degraded riparian zones and channel widening and incision occurs, to excellent where complex habitat elements (deep pools, suitable spawning gravels, large woody debris, riparian cover) exist in the vicinity of spring inflow or groundwater upwelling areas.

Extensive flatlands which existed along the Columbia prior to inundation have formed shallow wetlands and embayments along the shore of Lake Umatilla. These serve as holding or resting areas for migrating adults and juveniles (WDF, 1990).

Climate

Climate over the entire WRIA is typical of the continental climate which occurs on the east side of the Cascades. Average daily temperatures range from 70°F in the summer (with maximums commonly above 90 °F) and 37°F in the winter. Annual precipitation ranges from 20 to 25 inches in the headwaters of Rock Creek to less than 10 inches over most of the eastern half of the WRIA. Generally, about 75-85% of this precipitation occurs between November and May.

Land Use

Land use is well correlated with climate, vegetation, and topography. Almost 50% of the land base is in agricultural use (primarily wheat and other dryland crops) and occurs primarily on the non-forested areas of the plateau and on level areas near the Columbia River. Non-forested rangeland comprises 37% of the WRIA, and is found in the canyons and in other non-forested areas unsuitable for agriculture. Less than 10% of the WRIA is forested, primarily in the headwaters of Rock Creek and Pine Creek. Forest lands are owned by Washington Department of Natural Resources, Boise Cascade Corporation, and a number of non-industrial private owners. These forest lands are also considered suitable for grazing, and many currently have active grazing allotments.

The WRIA is divided between Benton (50%), Klickitat (44%) and Yakima (6%) counties. Over 90% of the land base is privately owned. Total human population is approximately 50,000; over 95% of this population occurs in the city of Kennewick, located at the far eastern end of the WRIA. Urban development is limited to Kennewick, and in the unincorporated towns of Bickleton, Roosevelt, Paterson, Plymouth, and Finley. In total, these areas constitute less than one percent of the total watershed area, and do not exert any identifiable adverse impacts on fish in the WRIA.

DISTRIBUTION AND CONDITION OF STOCKS

The anadromous fish-bearing streams in WRIA 31 support steelhead (the anadromous form of rainbow trout); some utilization by coho and chinook salmon has been noted or has the potential to occur. Only one distinct stock indigenous to the WRIA has been identified (Rock Creek Summer Steelhead); the remaining utilization is either as a result of straying of other mid-Columbia stocks, or is incidental use associated with upriver migration of adults or downriver migration of juveniles.

Anadromous fish production within the WRIA is almost exclusively natural. There are no fish production facilities (hatcheries) located in the WRIA. Some acclimation sites (net pens) near the mouth of Rock Creek have been operated in the recent past for fall chinook (WDF, 1990) and possibly steelhead (D. Clayton, EKCD/CKCD, pers. comm.).

Distribution of species described below is shown on Map 1 (Appendix A).

<u>Chinook *(Onchorynchus tshawytscha)*</u>

Spring Chinook

No utilization by spring Chinook has been observed. There is incidental use associated with upriver migration of adults or downriver migration of juveniles from other Columbia River stocks; this use would generally be restricted to the shore of Lake Umatilla or the pool areas at the stream mouths.

Fall Chinook

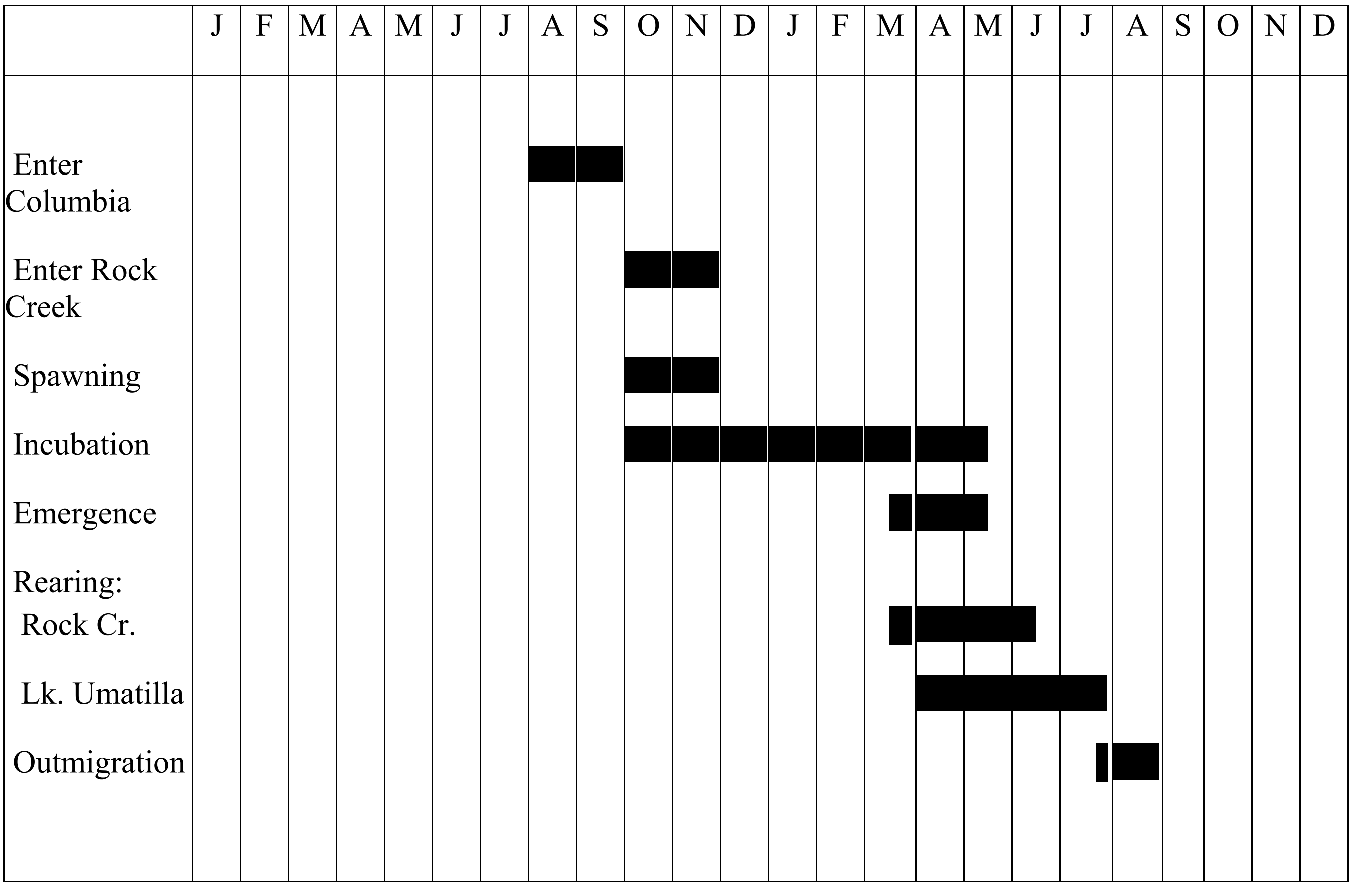
General. Fall chinook found in this WRIA are stray upriver brights belonging to either the wild Hanford Reach stock, or the Bonneville Pool Hatchery stock (WDF, 1990).

Life History (see Figure 2). No specific life history information exists for fall chinook which utilize WRIA 31 streams; the information below is inferred from that of the Columbia River upriver bright (Hanford Reach) stock (WDF, 1990).

Upriver bright chinook adults begin entering the Columbia in August, and will reside in freshwater for up to two months while they mature sexually. Utilization of Rock Creek for spawning may not occur until there are sufficient flows brought about by fall rains (generally, October or November).

Fry emerge from mid-March through Mid-May, and may utilize stream habitat though the early- to mid-spring, but probably move out to Lake Umatilla before

Figure 2. Freshwater life history chart for fall chinook (inferred from information on Columbia Upriver Bright stock).



flows diminish and temperatures increase in June or July. Emigrating smolts occupy near-shore habitat in Lake Umatilla in late July and August.

Distribution (see Appendix A, Map1). Spawning has been observed in Rock Creek up to the confluence with Luna Gulch (WDF, 1990); there is utilization by juveniles in the lower portions of Rock Creek and Chapman Creek (C. Dugger, WDFW, pers. comm.). There is incidental use associated with upriver migration of adults or downriver migration of juveniles from other Columbia River stocks; this use would generally be restricted to the shore of Lake Umatilla or the pool areas at the stream mouths.

Coho (Onchorynchus kisutch)

General. Coho found in this WRIA are believed to be stray hatchery fish; there may also be a minor amount of natural production (WDF, 1990).

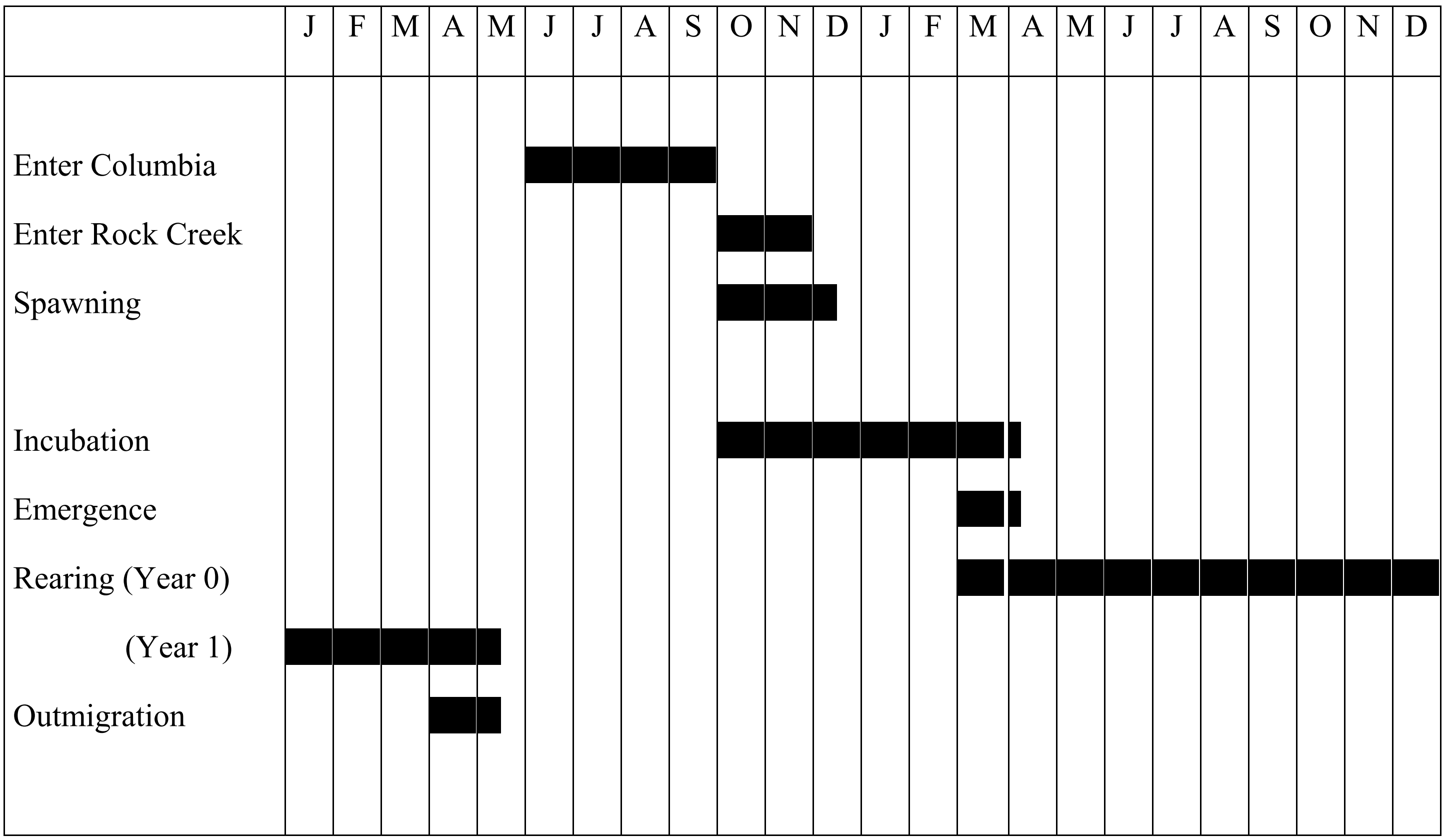
Life History (see Figure 3). No specific life history information exists for coho that utilize WRIA 31 streams; the information below is inferred from that of Columbia River hatchery stocks (WDF, 1990).

Adults begin entering the Columbia in July and migrate past Bonneville Dam from July through November, with a peak in September. Adults will remain in the mainstem until there are sufficient flows brought about by fall rains (generally, October or November). Spawning occurs shortly after stream entry, and continues until mid-December.

Fry emerge in March and early April, and will rear in available stream habitat though the following winter. Smolting and emigration occurs in April through mid-May. Emigrating smolts occupy near-shore habitat in Lake Umatilla at this time.

Distribution (see Appendix A, Map 1). Some utilization by juveniles has been noted in the lower portion of Chapman Creek (C. Dugger, WDFW, pers. comm.). WDFW has identified potential coho habitat in the lower portion of Glade Creek (P. LaRiviere, WDFW, pers. comm.). There is incidental use associated with upriver migration of adults or downriver migration of juveniles from other Columbia River stocks; this use would generally be restricted to the shore of Lake Umatilla or the pool areas at the stream mouths.

Figure 3. Freshwater life history chart for coho (inferred from information on Columbia River hatchery stocks).



Steelhead (Onchorynchus mykiss)

Rock Creek Summer Steelhead

General. Rock Creek Summer Steelhead are considered to be of native origin and are sustained by natural production. The stock is considered distinct from other mid-Columbia stocks based on geographic isolation of the spawning population (WDF and WDW, 1993).

Life History (see Figure 4). Adults enter the Columbia from May to November, and hold in the Columbia until fall and winter rains allow them to enter WRIA 31 streams. The adults will continue to hold in Rock Creek and its tributaries until the spawning period, which occurs from February through April.

Little information is available on juvenile life histories specific to this watershed; timings are inferred from those of nearby stocks and smolt sampling on the mainstem conducted by WDW in 1990. Fry are believed to emerge from April through mid-June, and will rear for up to two years. Smoltification and out-migration occur in April and May, peaking in early May.

Stock status. The 1992 SASSI report (WDF and WDW, 1993) indicated that the stock status for summer steelhead is unknown. This stock belongs to the Mid-Columbia Evolutionarily Significant Unit (ESU) for steelhead, which has been listed as "threatened" under the Endangered Species Act. This ESU includes all steelhead stocks in the Columbia River basin from Mosier Creek to the Yakima River, inclusive (NMFS, 1996).

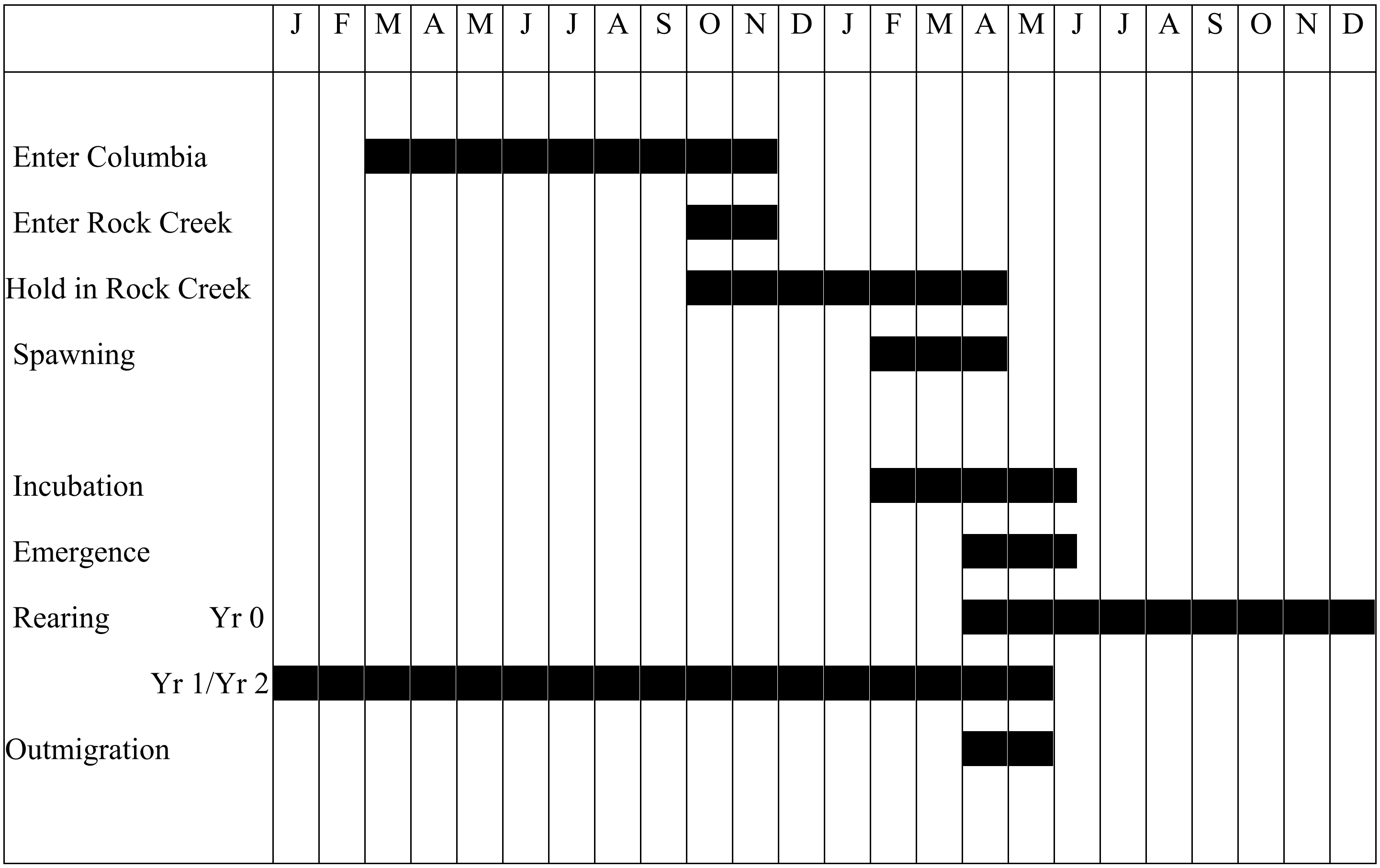
Distribution (see Appendix A, Map1). Steelhead are known to occur in Rock Creek up to a point 1/4 mile above the confluence with Quartz Creek (BLM 1985; BLM 1986); additional potential utilization may occur above this point, as well as in Quartz Creek.

Steelhead are known to occur in Squaw Creek up to the confluence with Harrison Creek, and have occurred historically as far as the confluence with Spring Creek (C. Dugger, WDFW, pers. comm.).

Juvenile of the species *O. mykiss* (i.e. may be steelhead or rainbow trout) have been observed in lower Chapman Creek (C. Dugger, WDFW, pers. comm.). If these are steelhead juveniles, it is uncertain whether they are from the Rock Creek stock, or are strays from other mid- or upper-Columbia stocks.

Steelhead spawning has been observed in Wood Gulch and Bighorn Canyon (C. Dugger, WDFW, pers. comm.) It is not known if these adults are from the Rock Creek stock, or are strays from other mid- or upper-Columbia stocks.

Figure 4. Freshwater life history chart for Rock Creek summer steelhead.



Potential spawning and rearing habitat has been identified in Pine Creek and Juniper Canyon Creek (James Lenzi, WDFW, pers. comm.) and in Alder Creek up to the confluence with Six Prong Creek (C. Dugger, WDFW, pers. comm.). Additional potential habitat may exist upstream of these locations.

In general, spawning may occur anywhere in the identified areas that suitable substrate material is found; rearing may be similarly widespread during most of the year, but may be restricted to spring-fed or groundwater upwelling areas during the summer and early fall.

Information Gaps

Further investigation of fish utilization and habitat availability and quality should be conducted on all accessible or potentially accessible streams. This activity may be conducted in conjunction with the Watershed Assessment which has been funded by the Columbia River Fish and Wildlife Authority and will be administered by the Yakama Nation.

ASSESSMENT OF HABITAT LIMITING FACTORS

ACCESS

Natural barriers

No specific natural barriers (falls, cascades, etc.) have been identified by fish biologists familiar with the area. Such barriers may exist in unsurveyed canyon reaches of WRIA 31 streams.

Artificial structural barriers

Pine Creek Culvert (SR 14) – This barrier occurs at the mouth of Pine Creek, and consists of a single 120” concrete-encased corrugated metal pipe located on line with the creek, and three 120” concrete-encased corrugated metal pipes offset approximately 150 feet to the east of the creek. All culverts are perched approximately 6 feet relative to the creek bed at the upstream end. Flow (and fish passage) in the culverts occurs only when high flows in Pine Creek create a backwater, or when the John Day pool in the Columbia River rises above the inlet elevation of the culverts; at other times, flow in either direction passes through the roadbed, effectively precluding passage. These culverts have been identified by WDFW as a total barrier to all anadromous species. Approximately three miles of potential steelhead habitat have been surveyed above this culvert.

Low Flow/Thermal Barriers

All or portions of all fish-bearing streams in the WRIA may go dry during some portion of the year, especially during normal or drier-than-normal years. Thermal barriers to migration of juveniles (high summer stream temperatures) may be inferred by temperature monitoring results and likely occur in the lower portions of most, if not all, of the streams in the WRIA. (For more discussion, see Water Quantity and Quality, pp. 29-31).

Key access factors limiting habitat productivity

The barrier culverts at SR 14 on Pine Creek preclude access to potential steelhead habitat.

Low or non-existent flows in all streams during the late summer, fall, and early winter will limit or preclude utilization by fall spawning adults (chinook, coho), and limit mobility of juveniles of all species.

High stream temperatures in the lower portions of all streams during the summer and early fall will limit mobility of juveniles of all salmonid species.

Information Gaps

Further investigation of potential barriers should be conducted on all fish bearing streams, using the assessment and inventory protocol described in WDFW (1998). This activity could be conducted in conjunction with the Watershed Assessment which has been funded by the Columbia River Fish and Wildlife Authority and will be administered by the Yakama Nation.

FLOODPLAINS/WETLANDS/RIPARIAN AREAS

Development of floodplains is limited over a large portion of the watershed by the geology and topography of the basin. Deeply incised canyons with narrow valley floors comprise most of the upper portions of fish-bearing tributaries. Floodplain development does occur in the lower alluvial sections of these streams (especially Rock Creek).

Current channel condition has been significantly impacted in many areas by a 75- to 100-year flood event which occurred in early 1996. Effects were especially pronounced in Rock Creek, with a number of reaches exhibiting extensive bank erosion, migration, widening and braiding, and uprooting of riparian vegetation. While these large flood events are commonly viewed as destructive to habitat, they are, in fact, natural occurrences which can produce long term habitat benefits through increases in habitat quantity and complexity, especially when complemented by channel and riparian restoration activities which serve to create habitat, cover, and bank and channel stability against smaller, more frequent flood events.

Floodplain Connectivity

The most significant floodplain connectivity problem appears to be channel incision (also known as entrenchment or downcutting). This process is initiated by a local decrease in the bed elevation of a channel; this decrease in elevation then moves upstream through erosion of the channel bed. While this process occurs naturally, it may be accelerated by activities which increase the frequency, magnitude, and duration of high flows (e.g. urbanization), or those that reduce the natural stability of the channel bed and banks (e.g. stream bed and bank erosion, removal of streambank vegetation). In incised channels, habitat quality is reduced due to several factors, including high fine sediment levels (associated with bed and bank erosion), reduced shade from riparian vegetation (which dies out as the local water table declines), and higher storm flows (which are concentrated within the incised area).

In this WRIA, channel incision has been observed in a number of locations and varies in severity from minor (less than three feet) to severe (20 feet or more). In all areas where incision was reported or observed, grazing was prevalent and is likely a primary accelerating factor. In one of the more severely impacted areas (along Six Prong Creek), there is a new floodplain and riparian zone developing within the incised area; this apparent recovery may be limited or delayed by grazing which continues to occur along the stream.

Steam-adjacent roads exist along portions of Rock Creek, Wood Gulch, Chapman Creek, and Glade Creek. Generally, these roads occur either at the edge of the floodplain, or on a terrace immediately above the floodplain; observed impacts of these roads on floodplain connectivity appears to be minimal.

Some armored diking has been observed at road crossings and public facilities (boat ramps). Observed impacts appear to be minimal.

Wetlands

Identified wetland areas are generally associated with springs which occur sporadically throughout the WRIA. Many of these spring areas also serve as cattle watering areas, to the detriment or exclusion of wetland vegetation and water quality. Fish habitat within these wetland areas is unlikely, owing to their small size; however, spring outflow in the immediate vicinity of fish-bearing waters may provide important cool-water refuges during the summer and early fall.

Riparian Function

Riparian composition and quality in this WRIA vary according to climate, elevation, floodplain characteristics, and intensity of land use. Overstory species include white alder and willow immediately adjacent to the stream, and Oregon white oak and black cottonwood on drier terrace areas. Ponderosa pine is generally a minor component in the lower alluvial reaches, but occurs in increasing frequency with elevation; grand fir and western hemlock are found in the headwater areas. Understory species include red-osier dogwood, chokecherry, wild rose, ocean spray, and various grasses and forbs.

In the headwaters and on the plateau, most streams are forested; riparian quality is variable depending on how recently timber harvest has occurred, the amount and quality of the residual riparian stand where harvest has occurred, and the level of grazing impact within the riparian area. There are anecdotal reports of beaver activity in these reaches (J. Matthews, Yakama Nation, pers. comm.).

Riparian forest stand development in the canyon areas is limited by the narrow floodplain area available, but, due to difficult access, is of relatively good quality and is only minimally impacted by grazing and forest management activities. There are some areas at the lower end of the Rock Creek canyon reach where flooding and resulting channel widening has damaged or obliterated riparian vegetation over several hundred feet of stream.

In the low elevation alluvial reaches, riparian forest stand development is limited by the lack of precipitation and runoff; where it is able to exist, it is generally limited to the area in the immediate vicinity of stream channels. Riparian quality is highly variable; the riparian zone is non-existent over significant portions of the alluvial reaches of all streams, while elsewhere, it occurs as a strip varying in width from 15 feet (essentially, a single row of trees) to over 150 feet. Riparian vegetation in this area is impacted by grazing activities, which tend to be concentrated along streams; these impacts are both direct (browsing, trampling, soil compaction) and indirect (bank instability and resulting channel widening).

Key factors limiting habitat productivity

Grazing and trampling by cattle in and near stream banks has caused accelerated channel incision (entrenchment, downcutting) and resulted in a reduction in the quality and amount of available existing or potential fish habitat; continued grazing activity in these areas may delay recovery where functional floodplains and riparian areas are becoming reestablished.

Channel widening and obliteration of riparian zones caused by a 75 to 100 year flood event in 1996 has resulted in locally poor habitat quality and riparian condition. While there may be long term benefits (LWD recruitment, creation of complex habitat) as a result of this event, there may be opportunity to accelerate habitat recovery and improve stability against smaller, more frequent floods through channel and riparian restoration activities.

Cattle watering at, or in the vicinity of, spring areas may have adverse impacts on water quality. Spring outflow into fish-bearing waters may provide important cool water refuges for juvenile salmonids during the summer and early fall.

Functional quality of riparian areas has been adversely impacted by grazing and forest practices in many locations throughout the watershed. Types of impacts include removal of or damage to riparian vegetation and compaction and erosion of stream banks and adjacent floodplain areas.

Information Gaps

Identification of all areas exhibiting the limiting factors identified above was not possible, given the limited amount of time and existing information. More detailed evaluations of the condition of channels, floodplains, wetlands, and riparian areas, which may then be used to identify priority areas for protection and restoration, should be conducted as part of the Watershed Assessment which has been funded by the Columbia River Fish and Wildlife Authority and will be administered by the Yakama Nation.

SEDIMENT

No systematic, evaluation of sediment sources and impacts has been conducted in the WRIA. Generally speaking, land-use related sediment sources in this watershed occur as a result of forest practices (e.g. streamside harvesting and construction and use of gravel and native surface roads and skid trails), grazing practices (e.g. streamside grazing), and from stream-adjacent county and private roads not associated with forest practices. Informal assessments suggest that in-channel fine sediment is not a problem, except in the upper reaches of Pine Creek.

Information Gaps

Identification of sediment sources, sinks, and sediment related impacts to habitat should be conducted as part of the Watershed Assessment which has been funded by the Columbia River Fish and Wildlife Authority and will be administered by the Yakama Nation.

WATER QUANTITY AND QUALITY

Streamflow

No flow regulation occurs within the WRIA; all flows occur within a natural flow regimen. Some minor diversions occur for irrigation and stock watering.

The streams in this WRIA are considered “flashy” (i.e. flows rise and fall rapidly in response to precipitation and/or snowmelt) in the canyon and alluvial reaches. Major flood events occur when winter rains (or rain-on-snow) falls on frozen soils; flood damage to channels and riparian areas from such a storm in early 1996 was evident.

Below the plateau, upland soils are thin and rocky; relatively narrow floodplain areas limit storage of runoff during the winter for later release in the summer. These landscape factors, combined with the virtual lack of precipitation from July through September, result in the dewatering of substantial portions of the stream network. This situation may be exacerbated in areas where channel widening has occurred and flow is distributed over several smaller, shallower channels. Channel dewatering has obvious impacts to fish, including reduction in juvenile mobility, limiting or precluding access for spawning, and mortality due to stranding.

Stream Temperature

All streams in this WRIA are classified as Class A streams (excellent water quality). Identified water quality problems include high water temperatures recorded during the summer. Rock Creek was identified as a candidate for the state 303(d) (water quality impaired) list for temperature based on multiple excursions of the standard ($18^oC/64.4^oF$) measured in 1990 and 1991 (WDOE, 1998); other streams (Alder Creek, Six Prong Creek, Wood Gulch, Pine Creek) were also found to exceed the standard (C&EKCD, 1991, EKCD, 1997).

After further monitoring and stream survey work, Ehinger (1996) concluded that Rock Creek showed “little impact from current forestry or agricultural activities”, but also indicated that “impacts from past grazing activity and episodic flood events, including lack of riparian cover and a shallow, braided stream channel” were evident. He also suggested that high stream temperatures observed in upper Rock Creek “may be natural for a small creek in a hot, sunny summer climate”, while temperatures in lower Rock Creek were “affected by the exposed rocky substrate (channel bed) and lack of riparian cover.”

Based on this assessment, a memorandum of agreement[H] was developed which allowed Rock Creek to be excluded from the 303(d) list subject to the following conditions, to be implemented jointly by the Department of Ecology and Eastern Klickitat Conservation District in cooperation with landowners:

(1) Identify riparian zones which can be successfully revegetated. Assist landowners to implement Best Management Practices which would enhance canopy cover and encourage channel rehabilitation.

(2) Monitor grazing and forestry practices.

(3) Advise landowners in the upper watershed of Best Management Practices for road stability and riparian corridor harvesting.

(4) Continue water quality monitoring to obtain data for long range planning and for landowners participation with Best Management Practices.

[H] Memorandum of Agreement between the Washington State Department of Ecology and Eastern Klickitat Conservation District regarding the delisting of Rock Creek form Section 303(d) list of the Clean Water Act. Signed July 9, 1996.

(5) Seek funds to assist with monitoring and rehabilitation efforts.

(6) Submit a yearly progress report.

Implementation of this agreement is ongoing and will continue at least through 2001.

The temperature situation identified in the Rock Creek watershed is likely for all streams in the WRIA; stream monitoring by the Eastern Klickitat Conservation District (1997) has confirmed exceedances of the standard at most of the 27 sites where thermographs have been installed. Based on temperature data through 1997, it appears that exceedances of the standard at higher elevations (plateau and upper canyon reaches) are relatively minor and of short duration; some thermal stressing of juvenile salmonids may occur, but may be avoided if there is access to cool water refuges (areas of spring outflow or groundwater upwelling). In lower canyon and alluvial reaches, exceedances extend well into the sub-lethal or lethal ranges for salmonids and are of long duration. It is unknown to what extent cool water refuges exist in these reaches.

Key factors limiting habitat productivity

Low or non-existent flows in all streams during the late summer, fall, and early winter will limit or preclude utilization by fall spawning adults (chinook, coho), limit mobility of juveniles of all species, and may result in mortality due to stranding.

High stream temperatures in the lower portions of all streams during the summer and early fall will limit mobility of juveniles of all salmonid species, and may result in mortality due to thermal stress.

Information gaps:

A better understanding of the causative factors of high stream temperatures is needed to help identify the types and location of restoration activities that will provide the greatest benefit. A stream temperature study should be conducted as part of the Watershed Assessment which has been funded by the Columbia River Fish and Wildlife Authority and will be administered by the Yakama Nation.

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APPENDICES

APPENDIX B:

THE RELATIVE ROLE OF HABITAT IN HEALTHY POPULATIONS OF NATURAL SPAWNING SALMON

Carol Smith

Washington Conservation Commission

During the last 10,000 years, Washington State anadromous salmonid populations have evolved in their specific habitats (Miller, 1965). Water chemistry, flow, and the physical stream components unique to each stream have helped shaped the characteristics of each salmon population. These unique physical attributes have resulted in a wide variety of distinct salmon stocks for each salmon species throughout the State. Within a given species, stocks are population units that do not extensively interbreed because returning adults rely on a stream's unique chemical and physical characteristics to guide them to their natal grounds to spawn. This maintains the separation of stocks during reproduction, thus preserving the distinctiveness of each stock.

Throughout the salmon's life cycle, the dependence between the stream and a stock continues. Adults spawn in areas near their own origin because survival favors those that do. The timing of juveniles leaving the river and entering the estuary is tied to high natural river flows. It has been theorized that the faster speed during out-migration reduces predation on the young salmon and perhaps is coincident to favorable feeding conditions in the estuary (Wetherall, 1971). These are a few examples that illustrate how a salmon stock and its environment are intertwined throughout the entire life cycle.

Salmon habitat includes the physical, chemical and biological components of the environment that support salmon. Within freshwater and estuarine environments, these components include water quality, water quantity or flows, stream and river physical features, riparian zones, upland terrestrial conditions, and ecosystem interactions as they pertain to habitat. However, these components closely intertwine. Low stream flows can alter water quality by increasing temperatures and decreasing the amount of available dissolved oxygen, while concentrating toxic materials. Water quality can impact stream conditions through heavy sediment loads, which result in a corresponding increase in channel instability and decrease in spawning success. The riparian zone interacts with the stream environment, providing nutrients and a food web base, woody debris for habitat and flow control (stream features), filtering runoff prior to surface water entry (water quality), and providing shade to aid in water temperature control.

Salmon habitat includes clean, cool, well-oxygenated water flowing at a normal (natural) rate for all stages of freshwater life. In addition, salmon survival depends upon specific habitat needs for egg incubation, juvenile rearing, migration of juveniles to saltwater, estuary rearing, ocean rearing, adult migration to spawning areas, and spawning. These specific needs can vary by species and even by stock.

When adults return to spawn, they not only need adequate flows and water quality, but also unimpeded passage to their natal grounds. They need deep pools with vegetative cover and instream structures such as root wads for resting and shelter from predators. Successful spawning and incubation depend on sufficient gravel of the right size for that particular population, in addition to the constant need of adequate flows and water quality, all in unison at the necessary location.

After spawning, the eggs need stable gravel that is not choked with sediment. River channel stability is vital at this life history stage. Floods have their greatest impact to salmon populations during incubation, and flood impacts are worsened by human activities. In a natural river system, the upland areas are forested, and the trees and their roots stores precipitation, which slows the rate of storm water into the stream. The natural, healthy river is sinuous and contains large pieces of wood contributed by an intact, mature riparian zone. Both slow the speed of water downstream. Natural systems have floodplains that are connected directly to the river at many points, allowing wetlands to store flood water and later discharge this storage back to the river during lower flows. In a healthy river, erosion or sediment input is great enough to provide new gravel for spawning and incubation, but does not overwhelm the system, raising the riverbed and increasing channel instability. A stable incubation environment is essential for salmon, but is a complex function of nearly all habitat components contained within that river ecosystem.

Once the young fry emerge from the gravel nests, certain species such as chum, pink, and some chinook salmon quickly migrate downstream to the estuary. Other species, such as coho, steelhead, bulltrout, and chinook, will search for suitable rearing habitat within the side sloughs and channels, tributaries, and spring-fed "seep" areas, as well as the outer edges of the stream. These quiet-water side margin and off channel slough areas are vital for early juvenile habitat. The presence of woody debris and overhead cover aid in food and nutrient inputs as well as provide protection from predators. For most of these species, juveniles use this type of habitat in the spring. Most sockeye populations migrate from their gravel nests quickly to larger lake environments where they have unique habitat requirements. These include water quality sufficient to produce the necessary complex food web to support one to three years of salmon growth in that lake habitat prior to outmigration to the estuary.

As growth continues, the juvenile salmon (parr) move away from the quiet shallow areas to deeper, faster areas of the stream. These include coho, steelhead, bulltrout, and certain chinook. For some of these species, this movement is coincident with the summer low flows. Low flows constrain salmon production for stocks that rear within the stream. In non-glacial streams, summer flows are maintained by precipitation, connectivity to wetland discharges, and groundwater inputs. Reductions in these inputs will reduce that amount of habitat; hence the number of salmon dependent on adequate summer flows.

In the fall, juvenile salmon that remain in freshwater begin to move out of the mainstems, and again, off-channel habitat becomes important. During the winter, coho, steelhead, bulltrout, and remaining chinook parr require habitat to sustain their growth and protect them from predators and winter flows. Wetlands, stream habitat protected from the effects of high flows, and pools with overhead are important habitat components during this time.

Except for bulltrout and resident steelhead, juvenile parr convert to smolts as they migrate downstream towards the estuary. Again, flows are critical, and food and shelter are necessary. The natural flow regime in each river is unique, and has shaped the population's characteristics through adaptation over the last 10,000 years. Because of the close inter-relationship between a salmon stock and its stream, survival of the stock depends heavily on natural flow patterns.

The estuary provides an ideal area for rapid growth, and some salmon species are heavily dependent on estuaries, particularly chinook, chum, and to a lesser extent, pink salmon. Estuaries contain new food sources to support the rapid growth of salmon smolts, but adequate natural habitat must exist to support the detritus-based food web, such as eelgrass beds, mudflats, and salt marshes. Also, the processes that contribute nutrients and woody debris to these environments must be maintained to provide cover from predators and to sustain the food web. Common disruptions to these habitats include dikes, bulkheads, dredging and filling activities, pollution, and alteration of downstream components such as lack of woody debris and sediment transport.

All salmonid species need adequate flow and water quality, spawning riffles and pools, a functional riparian zone, and upland conditions that favor stability, but some of these specific needs vary by species, such as preferred spawning areas and gravel. Although some overlap occurs, different salmon species within a river are often staggered in their use of a particular type of habitat. Some are staggered in time, and others are separated by distance.

Chinook salmon have three major run types in Washington State. Spring chinook are in their natal rivers throughout the calendar year. Adults begin river entry as early as February in the Chehalis, but in Puget Sound, entry doesn't begin until April or May. Spring chinook spawn from July through September and typically spawn in the headwater areas where higher gradient habitat exists. Incubation continues throughout the autumn and winter and generally requires more time for the eggs to develop into fry because of the colder temperatures in the headwater areas. Fry begin to leave the gravel nests in February through early March. After a short rearing period in the shallow side margins and sloughs, all Puget Sound and coastal spring chinook stocks have juveniles that begin to leave the rivers to the estuary throughout spring and into summer (August). Within a given Puget Sound stock, it is not uncommon for other chinook juveniles to remain in the river for another year before leaving as yearlings, so that a wide variety of outmigration strategies are used by these stocks. The juveniles of spring chinook salmon stocks in the Columbia Basin exhibit some distinct juvenile life history characteristics. Generally, these stocks remain in the basin for a full year. However, some stocks migrate downstream from their natal tributaries in the fall and early winter into larger rivers and Columbia River where they are believed to over winter prior to outmigration the next spring as yearling smolts.

Adult summer chinook begin river entry as early as June in the Columbia, but not until August in Puget Sound. They generally spawn in September and/or October. Fall chinook stocks range in spawn timing from late September through December. All Washington summer and fall chinook stocks have juveniles that incubate in the gravel until January through early March, and outmigration downstream to the estuaries occurs over a broad time period (January through August). Within a few of these stocks, is a component of juveniles that remain in freshwater for a full year after emerging from the gravel nests.

While some emerging chinook salmon fry outmigrate quickly, most inhabit the shallow side margins and side sloughs for up to two months. Then, some gradually move into the faster water areas of the stream to rear, while others outmigrate to the estuary. Most summer and fall chinook outmigrate within their first year of life, but a few stocks (Snohomish summer chinook, Snohomish fall chinook, upper Columbia summer chinook) have juveniles that remain in the river for an additional year, similar to many spring chinook (Marshall et al, 1995). However, those in the upper Columbia, have scale patterns that suggest that they rear in a reservoir-like environment (mainstem Columbia upstream from a dam) rather than in their natal streams and it is unknown whether this is a result of dam influence or whether it is a natural pattern.

The onset of coho salmon spawning is tied to the first significant fall freshet. They typically enter freshwater from September to early December, but has been observed as early as late July and as late as mid-January (WDF et al, 1993). They often mill near the river mouths or in lower river pools until freshets occur. Spawning usually occurs between November and early February, but is sometimes as early as mid-October and can extend into March. Spawning typically occurs in tributaries and sedimentation in these tributaries can be a problem, suffocating eggs. As chinook salmon fry exit the shallow low-velocity rearing areas, coho fry enter the same areas for the same purpose. As they grow, juveniles move into faster water and disperse into tributaries and areas which adults cannot access (Neave 1949). Pool habitat is important not only for returning adults, but for all stages of juvenile development. Preferred pool habitat includes deep pools with riparian cover and woody debris.

All coho juveniles remain in the river for a full year after leaving the gravel nests, but during the summer after early rearing, low flows can lead to problems such as a physical reduction of available habitat, increased stranding, decreased dissolved oxygen, increased temperature, and increased predation. Juvenile coho are highly territorial and can occupy the same area for a long period of time (Hoar, 1958). The abundance of coho can be limited by the number of suitable territories available (Larkin, 1977). Streams with more structure (logs, undercut banks, etc.) support more coho (Scrivener and Andersen, 1982), not only because they provide more territories (useable habitat), but they also provide more food and cover. There is a positive correlation between their primary diet of insect material in stomachs and the extent the stream was overgrown with vegetation (Chapman, 1965). In addition, the leaf litter in the fall contributes to aquatic insect production (Meehan et al, 1977).

In the autumn as the temperatures decrease, juvenile coho move into deeper pools, hide under logs, tree roots, and undercut banks (Hartman, 1965). The fall freshets redistribute them (Scarlett and Cederholm, 1984), and over-wintering generally occurs in available side channels, spring-fed ponds, and other off-channel sites to avoid winter floods (Peterson, 1980). The lack of side channels and small tributaries may limit coho survival (Cederholm and Scarlett, 1981). As coho juveniles grow into yearlings, they become more predatory on other salmonids. Coho begin to leave the river a full year after emerging from their gravel nests with the peak outmigration occuring in early May. Coho use estuaries primarily for interim food while they adjust physiologically to saltwater.

Steelhead have the most complex life history patterns of any Pacific salmonid species (Shapovalov and Taft, 1954). In Washington, there are two major run types, winter and summer steelhead. Winter steelhead adults begin river entry in a mature reproductive state in December and generally spawn from February through May. Summer steelhead adults enter the river from about May through October with spawning from about February through April. They enter the river in an immature state and require several months to mature (Burgner et al, 1992). Summer steelhead usually spawn farther upstream than winter stocks (Withler, 1966) and dominate inland areas such as the Columbia Basin. However, the coastal streams support more winter steelhead populations.

Juvenile steelhead can either migrate to sea or remain in freshwater as rainbow or redband trout. In Washington, those that are anadromous usually spend 1-3 years in freshwater, with the greatest proportion spending two years (Busby et al, 1996). Because of this, steelhead rely heavily on the freshwater habitat and are present in streams all year long.

Bulltrout/Dolly Varden stocks are also very dependent on the freshwater environment, where they reproduce only in clean, cold, relatively pristine streams. Within a given stock, some adults remain in freshwater their entire lives, while others migrate to the estuary where they stay during the spring and summer. They then return upstream to spawn in late summer. Those that remain in freshwater either stay near their spawning areas as residents, or migrate upstsream throughout the winter, spring, and early summer, residing in pools. They return to spawning areas in late summer. In some stocks juveniles migrate downstream in spring, overwinter in the lower river, then enter the estuary and Puget Sound the following late winter to early spring (WDFW, 1998). Because these life history types have different habitat characteristics and requirements, bulltrout are generally recognized as a sensitive species by natural resource management agencies. Reductions in their abundance or distribution are inferred to represent strong evidence of habitat degradation.

In addition to the above-described relationships between various salmon species and their habitats, there are also interactions between the species that have evolved over the last 10,000 years such that the survival of one species might be enhanced or impacted by the presence of another.

Most streams in Washington are home to several salmonid species, which together, rely upon freshwater and estuary habitat the entire calendar year. As the habitat and salmon review indicated, there are complex interactions between different habitat components, between salmon and their habitat, and between different species of salmon. For just as habitat dictates salmon types and production, salmon contribute to habitat and to other species.

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APPENDIX C:

1998 SALMON RECOVERY LAW (ESHB 2496)

(Note: This appendix does not include revisions to this RCW enacted in the 1999 legislative session under ESHB 5595)

CHAPTER 75.46 RCW

SALMON RECOVERY

Sections

RCW 75.46.005 Findings--Intent. The legislature finds that repeated attempts to improve salmonid fish runs throughout the state of Washington have failed to avert listings of salmon and steelhead runs as threatened or endangered under the federal endangered species act (16 U.S.C. Sec. 1531 et seq.). These listings threaten the sport, commercial, and tribal fishing industries as well as the economic well-being and vitality of vast areas of the state. It is the intent of the legislature to begin activities required for the recovery of salmon stocks as soon as possible, although the legislature understands that successful recovery efforts may not be realized for many years because of the life cycle of salmon and the complex array of natural and human-caused problems they face.

The legislature finds that it is in the interest of the citizens of the state of Washington for the state to retain primary responsibility for managing the natural resources of the state, rather than abdicate those responsibilities to the federal government. The legislature also finds that there is a substantial link between the provisions of the federal endangered species act and the federal clean water act (33 U.S.C. Sec. 1251 et seq.). The legislature further finds that habitat restoration is a vital component of salmon recovery efforts. Therefore, it is the intent of the legislature to specifically address salmon habitat restoration in a coordinated manner and to develop a structure that allows for the coordinated delivery of federal, state, and local assistance to communities for habitat projects that will assist in the recovery and enhancement of salmon stocks.

The legislature also finds that credible scientific review and oversight is essential for any salmon recovery effort to be successful.

The legislature therefore finds that a coordinated framework for responding to the salmon crisis is needed immediately. To that end, the salmon recovery office should be created within the governor's office to provide overall coordination of the state's response; an independent science team is needed to provide scientific review and oversight; the appropriate local or tribal government should provide local leadership in identifying and sequencing habitat restoration projects to be funded by state agencies; habitat restoration projects should be implemented without delay; and a strong locally based effort to restore salmon habitat should be established by providing a framework to allow citizen volunteers to work effectively. [1998 c 246 § 1.]

RCW 75.46.010 Definitions. The definitions in this section apply throughout this chapter unless the context clearly requires otherwise.

(1) "Adaptive management" means reliance on scientific methods to test the results of actions taken so that the management and related policy can be changed promptly and appropriately.

(2) "Critical pathways methodology" means a project scheduling and management process for examining interactions between habitat projects and salmonid species, prioritizing habitat projects, and assuring positive benefits from habitat projects.

(3) "Habitat project list" is the list of projects resulting from the critical pathways methodology under RCW 75.46.070(2). Each project on the list must have a written agreement from the landowner on whose land the project will be implemented. Projects include habitat restoration projects, habitat protection projects, habitat projects that improve water quality, habitat projects that protect water quality, habitat-related mitigation projects, and habitat project maintenance and monitoring activities.

(4) "Habitat work schedule" means those projects from the habitat project list that will be implemented during the current funding cycle. The schedule shall also include a list of the entities and individuals implementing projects, the start date, duration, estimated date of completion, estimated cost, and funding sources for the projects.

(5) "Limiting factors" means conditions that limit the ability of habitat to fully sustain populations of salmon. These factors are primarily fish passage barriers and degraded estuarine areas, riparian corridors, stream channels, and wetlands.

(6) "Project sponsor" is a county, city, special district, tribal government, a combination of such governments through

interlocal agreements provided under chapter 39.34 RCW, a nonprofit organization, or one or more private citizens.

(7) "Salmon" includes all species of the family Salmonidae which are capable of self-sustaining, natural production.

(8) "Salmon recovery plan" means a state plan developed in response to a proposed or actual listing under the federal endangered species act that addresses limiting factors including, but not limited to harvest, hatchery, hydropower, habitat, and other factors of decline.

(9) "Tribe" or "tribes" means federally recognized Indian tribes.

(10) "WRIA" means a water resource inventory area established in chapter 173-500 WAC as it existed on January 1, 1997.

(11) "Owner" means the person holding title to the land or the person under contract with the owner to lease or manage the legal owner's property. [1998 c 246 § 2.]

RCW 75.46.020 Implementation--Summary to legislature--Recommendations. By December 31, 1998, the governor shall submit a summary of the implementation of chapter 246, Laws of 1998 to the legislature, and include recommendations to the legislature that would further the success of salmon recovery. The recommendations may include:

(1) The need to expand or improve nonregulatory programs and activities;

(2) The need to expand or improve state and local laws and regulations; and

(3) The feasibility of forming a state-wide or regional community foundation or any other funding alternatives to assist in financing salmon recovery efforts. [1998 c 246 § 3.]

RCW 75.46.030 State of the salmon report. Beginning in December 2000, the governor shall submit a biennial state of the salmon report to the legislature during the first week of December. The report may include the following:

(1) A description of the amount of in-kind and financial contributions, including volunteer, private, and state, federal, tribal as available, and local government money directly spent on salmon recovery in response to actual, proposed, or expected endangered species act listings;

(2) A summary of habitat projects including but not limited to:

(a) A summary of accomplishments in removing barriers to salmon passage and an identification of existing barriers;

(b) A summary of salmon restoration efforts undertaken in the past two years;

(c) A summary of the role which private volunteer initiatives contribute in salmon habitat restoration efforts; and

(d) A summary of efforts taken to protect salmon habitat;

(3) A summary of collaborative efforts undertaken with adjoining states or Canada;

(4) A summary of harvest and hatchery management activities

affecting salmon recovery;

(5) A summary of information regarding impediments to successful salmon recovery efforts;

(6) A summary of the number and types of violations of existing laws pertaining to: (a) Water quality; and (b) salmon. The summary shall include information about the types of sanctions imposed for these violations;

(7) Information on the estimated carrying capacity of new habitat created pursuant to chapter 246, Laws of 1998; and

(8) Recommendations to the legislature that would further the success of salmon recovery. The recommendations may include:

(a) The need to expand or improve nonregulatory programs and activities; and

(b) The need to expand or improve state and local laws and regulations. [1998 c 246 § 4.]

RCW 75.46.040 Governor's salmon recovery office--Creation--Purpose. (Expires June 30, 2006.) (1) The salmon recovery office is created within the office of the governor to coordinate state strategy to allow for salmon recovery to healthy sustainable population levels with productive commercial and recreational fisheries. The primary purpose of the office is to coordinate and assist in the development of salmon recovery plans for evolutionarily significant units, and submit those plans to the appropriate tribal governments and federal agencies in response to the federal endangered species act. The governor's salmon recovery office may also:

(a) Act as liaison to local governments, the state congressional delegation, the United States congress, federally recognized tribes, and the federal executive branch agencies for issues related to the state's endangered species act salmon recovery plans; and

(b) Provide the biennial state of the salmon report to the legislature pursuant to RCW 75.46.030.

(2) This section expires June 30, 2006. [1998 c 246 § 5.]

RCW 75.46.050 Independent science panel--Selection--Terms--Purpose. (1) The governor shall request the national academy of sciences, the American fisheries society, or a comparable institution to screen candidates to serve as members on the independent science panel. The institution that conducts the screening of the candidates shall submit a list of the nine most qualified candidates to the governor, the speaker of the house of representatives, and the majority leader of the senate. The candidates shall reflect expertise in habitat requirements of salmon, protection and restoration of salmon populations, artificial propagation of salmon, hydrology, or geomorphology.

(2) The speaker of the house of representatives and the majority leader in the senate shall each remove one name from the nomination list. The governor shall consult with tribal representatives and the governor shall appoint five scientists from the remaining names on the nomination list.

(3) The members of the independent science panel shall serve

four-year terms. The independent science panel members shall elect the chair of the panel among themselves every two years. The members of the independent science panel shall be compensated as provided in RCW 43.03.250 and reimbursed for travel expenses in accordance with RCW 43.03.050 and 43.03.060.

(4) The independent science panel shall be governed by generally accepted guidelines and practices governing the activities of independent science boards such as the national academy of sciences. The purpose of the independent science panel is to help ensure that sound science is used in salmon recovery efforts. The governor's salmon recovery office shall request review of salmon recovery plans by the science review panel. The science review panel does not have the authority to review individual projects or project lists developed under RCW 75.46.060, 75.46.070, and 75.46.080 or to make policy decisions.

(5) The independent science panel shall submit its findings to the legislature and the governor. [1998 c 246 § 6.]

RCW 75.46.060 Habitat restoration project lists. (1)(a) Counties, cities, and tribal governments must jointly designate, by official resolution, the area for which a habitat restoration project list is to be developed and the lead entity that is to be responsible for submitting the habitat restoration project list. No project included on a habitat restoration project list shall be considered mandatory in nature and no private landowner may be forced or coerced into participation in any respect. The lead entity may be a county, city, conservation district, special district, tribal government, or other entity.

(b) The lead entity shall establish a committee that consists of representative interests of counties, cities, conservation districts, tribes, environmental groups, business interests, landowners, citizens, volunteer groups, regional fish enhancement groups, and other restoration interests. The purpose of the committee is to provide a citizen-based evaluation of the projects proposed to promote salmon habitat restoration. The interagency review team may provide the lead entity with organizational models that may be used in establishing the committees.

(c) The committee shall compile a list of habitat restoration projects, establish priorities for individual projects, define the sequence for project implementation, and submit these activities as the habitat restoration project list. The committee shall also identify potential federal, state, local, and private funding sources.

(2) The area covered by the habitat project list must be based, at a minimum, on a WRIA, combination of WRIAs, an evolutionarily significant unit, or any other area as agreed to by the counties, cities, and tribes meeting the requirements of this subsection. Preference will be given to projects in an area that contain a salmon species that is listed or proposed for listing under the federal endangered species act. [1998 c 246 § 7.]

RCW 75.46.070 Critical pathways methodology--Habitat work list. (1) Critical pathways methodology shall be used to develop a habitat project list and a habitat work schedule that ensures salmon restoration activities will be prioritized and implemented in a logical sequential manner that produces habitat capable of sustaining healthy populations of salmon.

(2) The critical pathways methodology shall:

(a) Include a limiting factors analysis for salmon in streams, rivers, tributaries, estuaries, and subbasins in the region. The technical advisory group shall have responsibility for the limiting factors analysis;

(b) Identify local habitat projects that sponsors are willing to undertake. The projects identified must have a written agreement from the landowner on which the project is to be implemented. Project sponsors shall have the lead responsibility for this task;

(c) Identify how projects will be monitored and evaluated. The project sponsor, in consultation with the technical advisory group and the appropriate landowner, shall have responsibility for this task; and

(d) Describe the adaptive management strategy that will be used. The committee established under RCW 75.46.060 shall have responsibility for this task. If a committee has not been formed, the technical advisory group shall have the responsibility for this task.

(3) The habitat work list shall include all projects developed pursuant to subsection (2) of this section as well as any other salmon habitat restoration project implemented in the region. The work list shall also include the start date, duration, estimated date of completion, estimated cost, and, if appropriate, the affected salmonid species of each project. Each schedule shall be updated on an annual basis to depict new activities. [1998 c 246 § 8.]

RCW 75.46.080 Interagency review team--Duties. (1) Representatives from the conservation commission, the department of transportation, and the department of fish and wildlife shall establish an interagency review team. Except as provided in subsection (6) of this section, habitat restoration project lists shall be submitted to the interagency review team by January 1st and July 1st of each year beginning in 1999.

(2) If no lead entity has been formed under RCW 75.46.060, the interagency review team shall rank, prioritize, and dispense funds for habitat restoration projects by giving preference to the projects that:

(a) Provide a greater benefit to salmon recovery;

(b) Will be implemented in a more critical area;

(c) Are the most cost-effective;

(d) Have the greatest matched, or in-kind funding; and

(e) Will be implemented by a sponsor with a successful record of project implementation.

(3) If a lead entity established under RCW 75.46.060 has been formed, the interagency review team shall evaluate project lists and may remove, but not add, projects from a habitat project list.

(4) The interagency review team shall provide a summary of funding for habitat restoration project lists to the governor and

to the legislature by December 1st of each year.

(5) The interagency review team may annually establish a maximum amount of funding available for any individual project, subject to available funding. The interagency review team shall attempt to assure a geographical balance in assigning priorities to projects.

(6) For fiscal year 1998, the department of fish and wildlife, the conservation commission, and the department of transportation may authorize, subject to appropriations, expenditures for projects that have been developed to restore salmon habitat before completion of the project lists required in RCW 75.46.060(2).

(7) Where a lead entity has been established pursuant to RCW 75.46.060, the interagency review team may provide block grants to the lead entity, subject to available funding. [1998 c 246 § 9.]

RCW 75.46.090 Technical advisory groups. (1) The conservation commission, in consultation with local government and the tribes, shall invite private, federal, state, tribal, and local government personnel with appropriate expertise to act as a technical advisory group.

(2) For state personnel, involvement on the technical advisory group shall be at the discretion of the particular agency. Unless specifically provided for in the budget, technical assistance participants shall be provided from existing full-time equivalent employees.

(3) The technical advisory group shall identify the limiting factors for salmonids to respond to the limiting factors relating to habitat pursuant to RCW 75.46.070(2).

(4) Where appropriate, the conservation district within the area implementing this chapter shall take the lead in developing and maintaining relationships between the technical advisory group and the private landowners under RCW 75.46.080. The conservation districts may assist landowners to organize around river, tributary, estuary, or subbasins of a watershed.

(5) Fishery enhancement groups and other volunteer organizations may participate in the activities under this section. [1998 c 246 § 10.]

RCW 75.46.100 Sea grant program--Technical assistance authorized. The sea grant program at the University of Washington is authorized to provide technical assistance to volunteer groups and other project sponsors in designing and performing habitat restoration projects that address the limiting factors analysis of regional habitat work plans. The cost for such assistance may be covered on a fee-for-service basis. [1998 c 246 § 11.]

RCW 75.46.110 Southwest Washington salmon recovery region--Created. The southwest Washington salmon recovery region, whose boundaries are provided in chapter 60, Laws of 1998, is created. If chapter 60, Laws of 1998 is not enacted by July 1, 1998, this section is null and void. [1998 c 246 § 12.]

NOTES:

Reviser's note: Chapter 60, Laws of 1998 took effect March 19, 1998.

RCW 75.46.120 Work group--Evaluation of mitigation alternatives. (1) The departments of transportation, fish and wildlife, and ecology, and tribes shall convene a work group to develop policy guidance to evaluate mitigation alternatives. The policy guidance shall be designed to enable committees established under RCW 75.46.060 to develop and implement habitat project lists that maximize environmental benefits from project mitigation while reducing project design and permitting costs. The work group shall seek technical assistance to ensure that federal, state, treaty right, and local environmental laws and ordinances are met. The purpose of this section is not to increase regulatory requirements or expand departmental authority.

(2) The work group shall develop guidance for determining alternative mitigation opportunities. Such guidance shall include criteria and procedures for identifying and evaluating mitigation opportunities within a watershed. Such guidance shall create procedures that provide alternative mitigation that has a low risk to the environment, yet has high net environmental, social, and economic benefits compared to status quo options.

(3) The evaluation shall include:

(a) All elements of mitigation, including but not limited to data requirements, decision making, state and tribal agency coordination, and permitting; and

(b) Criteria and procedures for identifying and evaluating mitigation opportunities, including but not limited to the criteria in chapter 90.74 RCW.

(4) Committees established under RCW 75.46.060 shall coordinate voluntary collaborative efforts between habitat project proponents and mitigation project proponents. Mitigation funds may be used to implement projects identified by a work plan to mitigate for the impacts of a transportation or other development proposal or project.

(5) For the purposes of this section, "mitigation" has the same meaning as provided in RCW 90.74.010. [1998 c 246 § 16.]

RCW 75.46.130 Appropriated funds. Only those funds appropriated for the habitat restoration projects under this chapter are subject to the requirements of RCW 75.46.080. [1998 c 246 § 17.]

RCW 75.46.900 Captions not law. Captions used in this chapter are not any part of the law. [1998 c 246 § 18.]